

Application No.: 10/748,274

IN THE DRAWINGS

Please insert Fig. 4C as indicated on the enclosed copies thereof. Fig. 4C has been added so as to illustrate a semiconductor chip having its principal surface facing down and a connection member described in the specification.

REMARKS

I. Introduction

In response to the Office Action dated January 18, 2005, Applicants have added Fig. 4C to illustrate a semiconductor chip having its principal surface facing down and a connection member as described in the specification. Also, Applicants have amended claim 1 so as to further clarify the claimed invention. New claim 10 is added. Support for these amendments can be found, for example, in Figs. 1A, 2A and 3B, and at page 11, lines 16-21 and lines 24-26 of the specification. No new matter has been added.

For the reasons set forth below, Applicants respectfully submit that all pending claims are patentable over the cited prior art references.

II. The Rejection Of Claims 1-5 Under 35 U.S.C. § 112, Second Paragraph

Claims 1-5 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Specifically, it is asserted that it is unclear what the claim term “thin” refers to.

However, as described at page 9, lines 1-2 of the specification, the term “to thin” means to reduce the thickness of the lead frame via, for example, etching so that the die pad and the lead can be placed at different height levels to form a stepped portion without having to press the lead frame. Nonetheless, in an effort to advance prosecution, claim 1 has been amended to recite “a die pad provided by *removing* a lower portion of a lead frame” and “a plurality of leads provided by *removing* an upper portion of the lead frame.” Accordingly, it is respectfully requested that the pending rejection to claim 1 under 35 U.S.C. § 112, second paragraph, be withdrawn in view of the foregoing amendments.

With respect to claim 3, it is asserted that the claimed limitations “semiconductor chip is mounted with its principal surface facing down” and “the connection member is a bump” are not shown in the drawings. In response, Applicants have added Fig. 4C so as to demonstrate the foregoing claimed subject matter. Accordingly, it is respectfully requested that the pending rejection to claim 3 under 35 U.S.C. § 112, first paragraph, be withdrawn in view of the newly added Fig. 4C to Applicants’ drawings.

III. The Rejection Of Claims 1, 2 and 5 Under 35 U.S.C. § 102

Claims 1, 2 and 5 are rejected under 35 U.S.C. § 102(e) as being anticipated by US Pub No. 2003/0001249 to Shimanuki. Applicants respectfully traverse this rejection for at least the following reasons.

Claim 1 recites in-part a die pad provided by *removing* a lower portion of a lead frame, and a plurality of leads provided by *removing* an upper portion of the lead frame.

As a preliminary matter, it is respectfully submitted that Shimanuki is completely silent with regard to reducing the thickness of the die pad and the lead, let alone *specifically* disclose *removing* the *lower* portion or the *upper* portion of the lead frame to meet the claim limitation recited in claim 1. It appears that the pending Office Action merely assumes that the die pad and the lead of Shimanuki are thinned or a specific portion thereof is removed without providing any support for this allegation. It should be recognized that the die pad and the lead of Shimanuki are readily provided as they are intended in Fig. 4 of Shimanuki without having the need to reduce the thickness thereof. If the Examiner maintains the pending rejection, it is respectfully requested that the foregoing distinctions be addressed so that the Applicants may further address the Examiner’s arguments.

Additionally, claim 1 recites in-part that the upper surface of the die pad is located **higher** than the upper surface of the lead. The Examiner relies on Figs. 10(e) and 12 of Shimanuki for allegedly disclosing the aforementioned feature. Specifically, it is asserted that the upper surface of the die pad 5 is located higher than the upper surface of the lead 2. However, Applicants respectfully disagree with the Examiner's interpretation, because Shimanuki clearly shows that the upper surface of the die pad 5 having the suspension lead 4 integrally formed is **level** with the upper surface of the lead 2 (i.e., lead section 3). This is supported by the **shaded region** having a **uniform** surface characterizing the die pad 5, suspension lead 4 and lead section 3 as illustrated in Figs. 8, 14, 16 and 25 of Shimanuki.

Accordingly, as anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), and at a minimum, Shimanuki fails to disclose or suggest the foregoing claim elements, it is clear that Shimanuki does not anticipate claim 1, or any of the claims dependent thereon.

IV. The Rejection Of Claims 1 and 2 Under 35 U.S.C. § 102

Claims 1 and 2 are rejected under 35 U.S.C. § 102(b) as being anticipated by JP No. 11-260990 to Yamaguchi. Applicants respectfully traverse this rejection for at least the following reasons.

In the pending rejection, the Examiner relies on Fig. 1 of Yamaguchi as allegedly disclosing a flange part 13b provided by thinning the lower portion of the alleged lead frame. However, it is respectfully submitted that the "flange part" described by Yamaguchi is not provided by thinning or removing the **lower** portion of the alleged lead frame. Rather, the

“flange part” described in Yamaguchi at best refers only to a manner of removing the *upper* portion of the die pad 13. This is evidenced by the fact that Yamaguchi expressly discloses etching the *surface* of the die pad 13. Accordingly, if the lower portion of the alleged lead frame is removed in the manner perceived by the Examiner, the flange part 13b would not be formed.

Furthermore, claim 1, as amended, recites that the suspension leads are not bent in a bending process. As discussed throughout the Background Art Section of the specification, the conventional technique requires pressing the lead frame and bending the suspension leads 108 upward to thereby elevate the upper surface of the die pad 102 to be higher than that of the semi-finished lead 103a. However, the instant inventors have discovered that a bending stress is produced during such a bending process to the suspension leads 108 and the die pad 102, and this bending stress remains un-removed even after the conventional device is resin-encapsulated. Accordingly, by thinning the die pad, the leads and/or the suspension leads of the lead frame as disclosed in the present invention, the upper surface of the die pad can be elevated at a degree higher than that of the leads without having to bend the suspension leads which causes an undesirable stress to the resin-encapsulated device.

In contrast, the alleged suspension leads 14/45 of Yamaguchi are bent during the manufacturing process as illustrated in Fig. 12. In this regard, Yamaguchi, at best, is merely cumulative to Applicants’ admitted prior art disclosed on pages 1-4 of Applicants’ specification with respect to bending the suspension leads so as to place the die pad 13 at a level higher than that of the leads 18.

Accordingly, as anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir.

1983), and at a minimum, Yamaguchi fails to disclose or suggest the foregoing claim elements, it is clear that Yamaguchi does not anticipate claim 1, or any of the claims dependent thereon.

V. The Rejection Of Claims 1, 3 and 4 Under 35 U.S.C. § 102

Claims 1, 3 and 4 are rejected under 35 U.S.C. § 102(b) as being anticipated by USP No. 6,661,087 to Wu. Applicants respectfully traverse this rejection for at least the following reasons.

Claim 1 recites in-part that a plurality of leads are provided by removing an *upper* portion of the lead frame. In the pending rejection, the Examiner relies on Fig. 4 of Wu for allegedly disclosing the aforementioned feature. However, it is respectfully submitted that the conclusion set forth in the pending rejection departs from what is disclosed in Wu. That is, Wu expressly discloses forming a plurality of outer leads 32 having J-like or gull swing shape so that the upper portion thereof is *not* removed. This is evidenced by the express objective given in Wu; namely, "... [to allow] a chip carrying surface 310 of a die pad 31 to be positioned with an appropriate height difference relative to the leads 32 (see, col. 5, lines 53-55)." It is also important to recognize that if the upper portion of the leads 32 is removed, the leads 32 would no longer be in J-like or gull swing shape. Thus, at a minimum, Wu does not disclose or suggest removing the upper portion of the leads 32.

Accordingly, as anticipation under 35 U.S.C. § 102 requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference, *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983), and at a minimum, Wu fails to disclose or suggest the foregoing claim elements, it is clear that Wu does not anticipate claim 1, or any of the claims dependent thereon.

VI. All Dependent Claims Are Allowable Because The Independent Claims From Which They Depend Are Allowable

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819 F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as independent claim 1 is patentable for the reasons set forth above, it is respectfully submitted that all claims dependent thereon are also in condition for allowance.

VII. Conclusion

Accordingly, it is urged that the application is in condition for allowance, an indication of which is respectfully solicited.

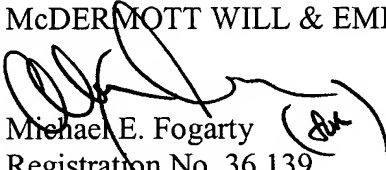
If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

Application No.: 10/748,274

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

McDERMOTT WILL & EMERY LLP


Michael E. Fogarty
Registration No. 36,139

600 13th Street, N.W.
Washington, DC 20005-3096
Phone: 202.756.8000 MEF/AHC:jdj
Facsimile: 202.756.8087
Date: April 18, 2005

**Please recognize our Customer No. 20277
as our correspondence address.**